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TECHCITING Alberta

JULY 1987 ISSUE 2

Shedding New Light on a Deadly Disease

It's easy to glamorize the laser, especially in medicine. You can read about new uses in most daily newspapers, lasers that remove age spots, freckles, tattoos or shatter kidney stones. Even removing cataracts is old hat.

Is it a magical beam capable of solving all ills? Not according to Dr. Malcolm McPhee, Director of Surgery at the Cross Cancer Institute, who believes the laser is only one of medicine's many tools to combat illness and disease.

The Cross Cancer Institute uses three types of lasers: Carbon dioxide, Neodymium:YAG, and Argon-driven dye lasers. The carbon dioxide laser has been used for the treatment of early stage cancers, such as cancer of the cervix, because the beam is absorbed by water and will not damage normal tissue underneath the cancer. The Neodymium:YAG laser on the other hand penetrates tissues deeply, but it is poorly absorbed by tissue water, and is more able to seal off blood vessels to prevent bleeding. An Argon-driven dye laser is used to produce high energy red light which may then be divided into multiple fibres and inserted directly into tumors through needles or used to irradiate tumors.

Dr. McPhee's interest in lasers began in 1970. Lasers were used at that time for some primitive applications, but massive costs outweighed their benefits over existing techniques.

In 1979 Dr. McPhee joined forces with Dr. John Tulip, Professor of Electrical Engineering, University of Alberta to continue the use of a YAG laser for treatment of bladder cancer.

In 1981, the first patient in North America was treated at the Cross Cancer Institute using this technique. The technology is now widely used throughout North America for patients who have exhausted other forms of treatment. Because there are alternate treatment methods, only a select group of patients (33) have been treated at the Institute since the inception of the procedure.

In 1983, Dr. Donald Chapman, an Institute Radiobiologist, joined the research team to work on a project involving a procedure called photodynamic therapy (PDT).

The procedure is used in bladder cancer cases and involves an injection of a photoactive dye one to two days before treatment. The dye travels through the body and is shed by normal tissue at a quicker rate than cancerous tissue.

When the argon-driven dye laser is applied to the area, it reacts with the dye. Some of the light is absorbed creating a photochemical process which interacts with cellular components in the tumors to destroy it through a toxic reaction. Basically, the tumor dies because it is starved of oxygen. The body then rids itself of the waste.

The Institute has recently been given the go-ahead to treat patients using this procedure. The operating room has been modified and is ready for its first patient, but like the treatment described earlier, it will only be used after other treatments have been tried.

Research costs for the Glenn Anderson-Acklands Laser Research Laboratory at the Institute will total $54,000 for 1987-88. The research completed in the past seven years has introduced laser therapy in Edmonton for specific treatment of lung, esophagus, rectum, cervix, and skin cancer as well as cancer of the bladder. The techniques cannot cure cancer which has spread throughout the body, but it has provided pain relief in some instances.

"The success of our research is largely due to three totally unrelated disciplines — medicine, electrical engineering and radiobiology — that have come together to attack this problem," said Dr. McPhee.

Until a cure is found, the Cross Cancer Institute will continue to explore the use of laser therapy as an alternative form of treatment.

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Alberta LASER Institute

Les Young, Minister, TRT (left), John Long, Chairman, LASER Institute and Myer Horowitz, President, University of Alberta, at the control panel of a small laser cutting system during the official opening of the Institute's materials processing centre.

Alberta companies are fortunate to have the expertise and equipment of the Alberta LASER Institute. Institute staff work with contracting companies to develop manufacturing processes or specialized laser-based systems that are more cost-effective than traditional production techniques.

Established in 1984, the Alberta LASER Institute builds on the University of Alberta's historical strength and demonstrated laser research capability. In 1985 the Government of Alberta provided $5 million to the Institute over five years, with the federal government committing $1.5 million over the same period.

Emphasis is in four areas: automated manufacturing, materials processing, medical applications, and microelectronic chip fabrication.

The Institute's Edmonton materials processing facility, recently opened by Les Young, Minister, Technology, Research and Telecommunications, has two lasers presently in use. The small laser cutting system is used on a project basis to cut one inch styrofoam which is usually cut by hot wires. If the test project is successful, the contracting company may purchase a laser cutting system of its own.

A large 5 Kw materials processing laser, the only laser in Canada of this size used for contract use, can cut, weld, heat treat and clad. An example of its capabilities is the hard coating of steel parts for downhole pumps used in oilfields.

John Long, Chairman of the Institute, believes "Alberta companies will benefit the most from the expertise and equipment available. For example, an Edmonton furniture manufacturer has just completed a feasibility project which could result in the Institute being contracted to cut intricate shapes in various woods until the manufacturer is able to purchase his own system."

The Institute's five technical staff have worked closely with more than a dozen companies. Their involvement will result in more Alberta companies taking advantage of Alberta's technological lead. For more information on how the Alberta LASER Institute can help your company, contact Dale Allsopp, Program Supervisor, 9924 - 45 Avenue, Edmonton, Alberta, T6E 5J1.

Laser Techno

Buck Rogers was the first comic book hero to use one, and with the advent of the "Star Wars" movies they became synonymous with high-tech weaponry. Lasers, however, had been around almost as long as old Buck when they burst on the scene May 15, 1960 at the Hughes Research Laboratory in Malibu, California. The Hughes Aircraft Co. harnessed the laser's ability to accurately determine distances, to manufacture the first laser rangefinder for tanks. Since that time, researchers have developed a variety of industrial, medical and educational uses for the laser.

The North American laser market in 1985 generated over $300 million in sales and is expected to grow by 25% each year. Sales in lasers used in the material processing market alone reached $162 million in 1986. Sales in other laser applications were $100 million for medicine, $120 million for research and development, $38 million in printing industries, $53 million for other communication devices and $31 million for musical compact disks and optical memory applications. Lasers also play an important role in microelectronics. The total market for micro-electronics manufacturing equipment which use lasers is forecast to reach $3. 5 billion by 1990.

Alberta is a veteran in laser technology and is well positioned to maintain a commanding technological lead. This is largely due to the active role of the Department of Electrical Engineering at the University of Alberta where research in the area of laser technology has been pursued since the mid-sixties. That tradition culminated with the formation of the Alberta LASER Institute in 1984.

While moviegoers of all ages thrilled to the laser battle between Luke Skywalker and Darth Vadar, few in the audience really

gy — Alberta Style

understood the process.

"LASER" is short for Light Amplification by Stimulated Emission of Radiation. Many substances, such as gases, ruby-like rods or semiconductors, can be used as sources of laser light. Gas lasers use gas mixtures, usually carbon dioxide, nitrogen and helium, and an electrical current to stimulate the gases to emit light. Some of the light is directed by mirrors to form the laser beam. Solid ruby-like rods also use the mirror method of forming the laser beam, but the rod is stimulated to emit light by flashing a discharge lamp similar to a camera flash.

It's no wonder industry has warmed up to using the laser. Laser light can be focused down to a spot no bigger than a speck of dust and the narrow beam generated, at different energy levels, can cut, melt or vaporize metals, plastic, paper or any other materials and perform delicate work in microelectronics.

Industrial lasers are used in the electronics, computer, automotive, aerospace, music, and apparel industries. The laser can be coupled with computers and robots for automated systems which means higher productivity at lower cost. Lasers are also more reliable. Because it is a non-contact tool, the expense of replacing worn or broken tools is eliminated.

General Systems Research Ltd. (GSR) of Edmonton manufactures laser systems for cutting fabric for automobile seats, in particular for General Motors' fleet of Cadillacs. GSR will also be introducing systems for the garment industry this summer.

Other Alberta companies are using lasers to perform many tasks with the help of the Alberta LASER Institute. So far, projects include: tungsten carbide cladding (bonding a layer of material to another) a turbine mounting brace used in oilfield flow measurement; intricate cutting of plastic and rubber gasket materials used in medical instrumentation; cutting plywood, oriented strand board, particle board, oak and maple for furniture; welding tantalum parts used in geological survey instrumentation; and scribing and cutting ceramic sheets used in electronic circuit substrates.

One Alberta company building a laser-sharp reputation is **Columbia Trophy and Engraving Ltd.** of Edmonton. The firm uses a carbon dioxide laser engraving system, the first in Western Canada, for small-run production and direct artwork, thereby reducing costs and producing a high quality product. The laser can engrave on wood, glass and anything non-metallic for plaques, trophies and awards. An example of Columbia Trophy's work is the laser engraving of lucite and walnut for the Canadian Football League Players' Association awards presented to its outstanding athletes for the 1986 season.

While promising, at present the use of medical lasers is limited due to their size and the lack of suitable devices to deliver the beam to a particular site on the body. Working to solve these problems is Dr. John Tulip, an engineer at the University of Alberta and the acknowledged Canadian expert on the medical use of lasers. Last summer, Dr. Tulip received a $150,000 grant from the Alberta Heritage Foundation for Medical Research to develop his ideas to the point where they can be manufactured and marketed.

Dr. Tulip and University of Alberta dentistry professor Dr. Kenneth Zakariasen have used a miniaturization technique to create a laser which replaces a dentist's drill. The next project underway involves producing a laser scalpel the size of a pencil, small enough to be held by a surgeon and just as precise.

Dr. Jim Halvorson and Dr. John Huckell, surgeons at the University of Alberta Hospital, are working with the Alberta LASER Institute to use a laser to cut bone cement, the glue used to affix bone and artificial hip and knee joints. The cement usually loosens over a five to ten year period in one of every four patients. Normal procedure is to chisel the cement out, but Dr. Halvorson and Dr. Huckell believe lasers will reduce the risk of bone chipping since there is no force used in removing the cement.

Laser applications in optical memory devices and laser disks also have tremendous potential for growth. A single disk the size of a record album can hold as much information as a set of encyclopedias.

There are a few companies such as Calgary's Technica Resource Development Ltd. experimenting with laser disks to store large amounts of data, seismic data in Technica's case.

Laser disks have many advantages over more conventional methods of storing and recording information. Disks provide a very high quality image, stereo sound (ask any audiophile) and computer information with large storage capacity. There is no image deterioration or wear on the disk, the content is permanent and no erasure or tampering is possible.

The Media and Technology Branch of Alberta Education has developed a laser disk called "Sightlines" that integrates still photography, video and audio for use in Alberta schools this fall.

Other laser applications in Alberta include the inertial confinement fusion research being carried out by Dr. Allan Offenberger and Dr. Robert Fedosejevs at the University of Alberta's Electrical Engineering Department.

The Lawrence Livermore National lab in the United States has donated a high power 1 kilojoule Kryton fluoride gas laser to the project. Laser fusion could

prove to be an alternative energy source in the future and research could increase knowledge in other laser fusion applications.

If you would like more information about laser technology, contact John Hughan, Senior Director, Technology Commercialization Branch, TRT.

He Shoots... They Score

Glenn Anderson, Number 9, of the Stanley Cup champion Edmonton Oilers has a unique relationship with Cross Cancer Institute patients and staff ... on and off the ice.

Glenn regularly drops by the Institute visiting patients and staff, and through the Anderson-Acklands Fund, directs funding to the Institute. The funding began in the 1985 NHL playoffs when Acklands Limited, an automotive, industrial and welding supplies distributor, donated $1,000 for each goal scored by Anderson. Acklands continued this novel fund-raising into the regular season as well.

Acklands has also taken a further step in funding laser research at the Institute. It is providing the $80,000 annual budget required for the laser laboratory to continue research in the treatment of tumors.

"Glenn and Acklands wanted some way to give something back to the community and we decided to assist the Institute," says Doug Cumming, Group Vice-President for Acklands. "The recognition of Acklands and Glenn's goal scoring is important, but not as important as finding better ways to treat and cure cancer," he adds.

Gasland Oil Ltd., an Edmonton based independent gas retailer, has joined forces with Acklands and upped the ante for each goal to $2,000. So when Glenn Anderson shoots and scores, the Cross Cancer Institute and cancer research are the big winners.

UPDATE

➪ **Northstar Instruments Ltd.** of Calgary has sold its Norstar 1000 Satellite Receivers to the U. S. Air Force. A Global Positioning System (GPS) receiver uses signals from GPS satellites to accurately calculate its position. This advanced technology is used as a precise survey instrument onshore and offshore, and as a navigation device on board aircraft and ships. The five channel Norstar 1000 is the only receiver of its kind, developed and manufactured in Canada.

➪ **Myrias Research Corporation** of Edmonton has sold $4 million in shares to a consortium consisting of Vencap Equities Alberta Ltd. of Edmonton, Ventures West Technologies of Vancouver and Adler and Co. of New York. The funds will be used to develop and market the Myrias Parallel Processing Computer System which harnesses 512 general purpose microprocessors. According to company officials, it is likely the largest microprocessor based parallel computer in existence.

➪ It won't rival the historic event linked with the immortal words "Watson come here, I need you," but a telecommunications milestone was set recently just the same by **Alberta Government Telephones** (AGT) and **Northern Telecom Canada Ltd.** The companies were successful in transmitting voice and data signals 107 km over a fibre-optics network without using repeater equipment. A signal repeater is normally required every 40 km. The system, using strands of fibre glass no thicker than human hair, recorded 400 error-free hours of service over lines installed between Calgary and Canmore to be used for the XV Winter Olympic Games.

➪ **Raylo Chemicals** of Edmonton has won a coveted Canadian Advanced Technology Association (CATA) Award of Distinction for Emerging Technology. Dr. Gerard Tertzakian, president of Terochem Laboratories Ltd., Raylo's parent company, accepted the prestigious award at the Annual Conference of the CATA in Ottawa. The award recognizes Raylo's work in the area of blocked deoxynucleosides, the building blocks of genetic engineering. Raylo is the world leader in the manufacture of modified nucleosides. Roy Woodridge, CATA President, also praised Raylo's achievements in the development of composite resins for the aerospace industry, synthetic insect aromas used to monitor or control insect populations and the company's current work in synthesizing a chemical to be used in production of AZT, an experimental drug in the treatment of AIDS — Acquired Immune Deficiency Syndrome.

➪ **IDACOM Electronics Ltd.** of Edmonton has delivered over 75 custom XPEs (protocol testers) to Nippon Telephone and Telegraph (NTT) in Japan. The protocol testers, used to assure that computers and different computer networks can communicate properly, passed stringent quality assurance tests performed by NTT inspectors. IDACOM'S XPE was the only foreign protocol test equipment selected by NTT. IDACOM, formed in 1981, is Canada's largest manufacturer of protocol testing equipment.

➪ Les Young, Minister, **Technology, Research and Telecommunications**, recently hosted a day-long meeting to discuss issues related to Alberta's Microelectronics sector with industry, university and government representatives. The meeting, "The Alberta Microelectronic Industry — The Present and the Potential," featured speakers from the Alberta LASER Institute, Alberta Microelectronic Centre, Electronics Test Centre, Supercomputer Project, LSI Logic Corporation of Canada Inc. and the Alberta Telecommunications Research Centre, as well as company representatives.

TECHCITING Alberta

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TECHNOLOGY OPPORTUNITIES BULLETIN

CANADIANA
FEB - 4 1988

COMMERCIALIZATION OF HIGH POWER LASER TECHNOLOGY

Reference **EL001**

This Edmonton based company designed, constructed and tested a new type of high powered carbon dioxide laser. The device can be used in a wide variety of industrial applications. The company has been examining the technical and financial feasibility of incorporating two of these upgraded 40 kilowatt units into a mobile, track-riding system and is now seeking a financial partner to further advance product research and commercialization.

REMOTE DATALOGGING EQUIPMENT

Reference **EL002**

This Edmonton based company manufactures portable IBM compatible low-power remote datalogging equipment and instrumentation devices for analog, static and pulse count data recording applications in most industries and environments. The company is seeking joint venture partners to further product development.

LIGHTING CONTROLS AND ELECTRONIC DISPLAYS

Reference **EL003**

This Edmonton based company manufactures custom traffic monitoring systems and a portable electronic message centre known as the Traffic Advisor which is exported to the U.S. through Alberta based distributors. The product uses Ferranty-Packard passive reflector technology which provides a very rugged, low maintenance display. The company is seeking joint venture or licensing partners to market its products in Europe.

LASER CUTTING MACHINES

Reference **AM001**

An Edmonton based manufacturer of computer controlled laser cutting machines is seeking new markets for its products. These state-of-the-art machines have, to date, been successfully utilized for the cutting of cloth, but are equally applicable to the mass production of intricate shapes in laminates and other thin section materials.

RISK ANALYSIS/RELIABILITY TESTING

Reference **AM002**

This Calgary based R & D company with its six years experience in cold climate technology, is seeking to diversify into the fields of risk analysis and reliability testing for products, systems and services. The company, through its long established Norwegian parent, has access to a vast array of testing and certification technology, and is seeking equity partners for the new venture who might also have access to relevant technologies.

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Circular Looms Weave High-Tech Future

Spinning straw into gold was easy for Rumplestiltskin. Bahadurali (Bud) Nurani, President, Novatex Manufacturing Canada Ltd., does it 1987 style — but his "straw" is plastic pellets and the "gold" is woven polypropylene and high density polyethylene bag and sheet products for industrial uses such as fertilizer, chemical and animal feed bags and tarpaulins, lumber wrap and awning materials.

Novatex Manufacturing Canada Ltd. was formed by Mr. Nurani in 1985. He chose Calgary to locate his plant to best serve Western Canada and Northwest U.S. markets, and because Alberta could provide a dependable supply of petro-chemical resins. Materials such as low, medium and high density polypropylene and polyethylene are used in Novatex's manufacturing process. The materials technology know-how available in the province, in addition to the by-products of the petroleum industry, have proven to be of great benefit to the company.

The resins are supplied in granular form, each about the size of a pea, from companies such as NOVA, An Alberta Corporation, Shell Products Chemicals Ltd. and Dow Chemical Canada Ltd. The granules are melted in the extrusion plant, stretched to form a thin plastic film which is cut into "yarn" and wound on bobbins for feeding into circular looms.

Polypropylene and polyethylene granules, byproducts of Alberta's oil patch, provide Novatex with the "fuel" to produce a varied line of woven plastic products.

The circular looms are the heart of the operation and Novatex is the only Canadian company using this technology. The looms are manufactured in Europe and according to Nurani, there are only half a dozen manufacturers in the U.S. using similar looms.

Each loom, fed by approximately 1,720 bobbins, spins at breakneck speed weaving plastic fabric in a large sock-like tube. Thickness and strength of the fabric is determined in the weaving process and depends on the final use of the product. If the client requires, the fabric can also be coated with polyethylene or polypropylene to make the material waterproof and airtight.

Novatex's Canadian competition is in Eastern Canada, where manufacturers use flat looms, but Nurani is quick to point out that circular looms are more flexible, more productive and produce a better product. Novatex produces 55,000 square metres or 592,204 square feet per day. If you were inclined to do so, you could completely "carpet" 455 average bungalows each measuring 1,300 square feet.

The fabric is cut, sewn, printed (up to 3 colours) and shipped out, in some cases back to the original suppliers of resins.

Novatex's initial investment was $6 million and created 55 jobs. A $1 million expansion has recently occurred with the addition of more circular looms and 15 new employees.

Nurani has kind words to say about the government's efforts to help entrepreneurs like him.

"One of the reasons for coming to Alberta was that I felt I was in safe hands. Anytime I had a problem, need advice or contacts, they (government) were always very helpful," he says.

Nurani is also interested in other high-tech advancements being developed in the province. Laser technology and computer aided design and manufacturing will be beneficial to Novatex's future and will help keep the company competitive.

The list of products which could be developed using Novatex technology is endless. Bud Nurani might not be able to spin straw into gold exactly, but given his energy and optimism there's no telling what could be next.

New Alberta Pharmaceutical Company in Edmonton

Les Young, Minister, TRT (l), Yukio Kobayashi, President, Taiho, and Dr. Ronald Micetich, University of Alberta, sign the agreement which creates SynPhar Laboratories.

SynPhar Laboratories Inc., the first pharmaceutical research and development company in Western Canada, opened its doors for business June 1 as a result of a joint venture agreement between Dr. Ronald C. Micetich, Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta, and President Yukio Kobayashi, Taiho Pharmaceutical Co. Ltd., Japan. The company's initial work will be in the design, synthesis and testing of new pharmaceutical compounds for treatment of infectious diseases, specifically antibiotics, antifungals, antivirals and anticancer agents. SynPhar Laboratories Inc., funded by Taiho Pharmaceutical Co. Ltd., a world leader in pharmaceuticals, will employ 20 people this year and expects to have 250 scientists on staff by 1990.

WATER JET CUTTING
Reference **AM003**

This recently established Edmonton based company is developing a very high pressure water jet cutting machine for cutting rock and other hard materials. Market research indicates a strong demand for machines of this nature from installers of pipelines and fibre optic cables. The company is part way through its research and development program and seeks patient capital to develop pre-production prototype machines.

VIDEODISC/VIDEOTEXT
Reference **CS001**

A Calgary based company involved in creating software and developing complete turn-key systems for videodisc and videotext, is seeking an equity partner for a development project involving videodisc product development for the travel industry.

SOFTWARE HOSPITALITY INDUSTRY
Reference **CS002**

A Calgary based company involved in software systems development for the hospitality and tourism industry, is seeking development and marketing funds for a fully integrated turn-key system for small and medium sized hotels.

SOFTWARE - INSURANCE BROKERAGE INDUSTRY
Reference **CS003**

A Calgary based company involved in software systems development for the brokerage communities involved in stocks and insurance, is seeking development and marketing funds for software solutions targetted at independent insurance brokers.

BIOLOGICAL REPELLENTS
Reference **TT001**

This newly formed company based in Calgary, is the developer of a synthetic pheromone for pest control. The company's method for synthetic production produces a pure and active form of pheromone. This simple process results in a product which is superior to that currently available but which was previously too expensive to undertake on a commercial basis. The company is interested in joint venture and/or licensing arrangements.

ANTIBALLISTIC PROTECTIVE DEVICE
Reference **TT002**

This newly formed Calgary company is based on a patented bullet proof vest. The product has been extensively tested and has proven to be superior to existing fabric armor protective devices. The company is seeking an equity partner to provide funding to support a U.S. marketing program.

FEED FLOW METER
Reference **TT003**

An internationally respected inventor has developed a feed metering system consisting of an encoded rotating disc, a fixed detector and a microprocessor. The disc rotates in proportion to the conveyor's velocity and is displaced vertically in proportion to the depth of the conveyed material; the microprocessor interprets the signals and can precisely control the feed rate of any additive material. Investors are required to license the patented system.

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TECHNOLOGY, RESEARCH
and TELECOMMUNICATIONS

Computers & Cows??

Bull you say! Not to Will Irvine, General Manager of the Calgary Public Livestock Market.

In July of last year, he introduced a system of selling cattle by computer using a software package developed by the Ontario Livestock Exchange.

Selling fattened cattle used to be a time-consuming task for ranchers and feed lot operators. Each was required to make dozens of phone calls to meatpacking plants to sell their cattle. Now with at least 15 head to sell, they simply call the Calgary market to list their stock, paying a fee of anywhere from $2.50 to $6.00 per animal.

After the cattle are inspected and accepted, the appropriate information is inputted to a computer network of buyers. The Livestock Market supplies the computers to 14 meatpacking plants.

The computer starts each lot at a predetermined price and then waits for a buyer to press a button on his terminal. When the bidding stops and the seller, waiting by his phone, accepts the final offer, the cattle are sold! The computer auction takes about a minute.

Beverley Irvine of the Livestock Market says, "the system is really working well, besides being more economical for the rancher to sell his cattle, the cattle don't have to leave the ranch before being sold. That saves time, is convenient and eliminates the potential for disease and death when the cattle are travelling. In addition, we sell more cattle."

The computer auction is held every Tuesday and Thursday morning at 10 a.m. Will Irvine says 22,000 head of cattle have been sold since the Calgary Public Livestock Market started using the system.

TECH-BITS

A regular feature highlighting activities at facilities and institutes in Alberta's high-tech infrastructure.

Dr. Clement W. Bowman has been appointed president of the **Alberta Research Council**, effective June 1, 1987. Dr. Bowman, who has been on the Council's Board of Directors since 1978, was Vice-President, Research for Esso Petroleum Canada, with responsibility for the Esso Research Centre in Sarnia, Ontario. ..... **The Alberta Telecommunications Research Centre** has signed sponsorship agreements with L.S.I. Logic Corporation of Canada, Alberta Government Telephones (AGT) and The City Of Edmonton (edmonton telephones) to carry out research at the Centre. The agreements (L.S.I. $2 million, AGT $2 million, edmonton telephones $1 million) provide for funding and services over a five year period for research and development in the area of telecommunications networks and integrated circuits. For more information contact: Ray Fortune, President, ATRC, Research Centre One, Edmonton Research and Development Park, 9415 - 20 Avenue, Edmonton, Alberta T6N 1E5, Telephone: (403) 461-3830. ..... **The Alberta Microelectronic Centre** (AMC) has appointed John Zupancic as President and Chief Executive Officer. Mr. Zupancic, who has served as Chairman of the Board since 1985, has been seconded from Esso Petroleum Canada for a two year period which became effective May 1, 1987.

On Display

Look for the Alberta Government booth at:

Canadian High Technology Show '87
Toronto, September 28-30, 1987

Techmart '87
Birmingham, United Kingdom
October 13-16, 1987

Telecom '87
Geneva, Switzerland
October 20-28, 1987

Alberta companies wishing to participate in future shows, please contact: John Tansowny, Director, Investment Promotion, TRT.

Voyage of Discovery: Engineering Centennial Showcase 87
November 5-8, 1987, Convention Centre, Edmonton, Alberta
November 12-15, 1987 Roundup Centre, Calgary, Alberta

The Alberta Engineering Centennial Committee is sponsoring a showcase in Edmonton and Calgary as part of its celebration of the 100th anniversary of engineering as an organized profession in Canada. Coinciding with Voyage of Discovery is the Engineering Centennial Symposium '87 (Edmonton — November 5 and 6, Calgary — November 12 and 13).

For information, contact: Engineering Centennial Showcase '87, 8107 - 43 Street, Edmonton, Alberta, T6B 2M3 or telephone Edmonton: Marilyn Norbury, (403) 465-0307/ 431-8109, Calgary: Sherry Hill (403) 262-4177/235-9159.

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